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Moment-rotation characteristics of reverse channel connections to tubular columns

The effect of material properties and the geometrical configurations of reverse channel flush end-plate connections (RCC) on the moment-rotation ($M-\phi$) relationship under monotonic loading are presented in this paper. The main focus of this research was on the stiffness, strength, sources of deformability, rotational capacity and failure mechanisms of the RCC. The investigations were based on parametric studies performed by using general finite element package ABAQUS (v.6.12) software. Hence, three-dimensional (3-D) FE models were developed for 268 specimens. The developed models were validated against the experimental results available from literature. All tests were able to achieve a rotational capacity beyond the minimum 0.03 rad. The results of the parametric study indicate that the key to the rotational capacity of RCC was found as the channel wall thickness to the flush end-plate thickness ratio. Furthermore, the ratio of channel depth to square hollow section (SHS) width was mainly responsible for the deformability of the column face and 0.72 is recommended as the minimum value of this ratio. On the other hand, the use of HSS (S690) reverse channel as part of the joint; compared to mild steel (S355), produced remarkable increase in both ultimate flexural resistance and the rotational capacity without compromise to the initial stiffness.

Biography

Celikag has completed her PhD in 1990 from University of Sheffield, UK. She then worked with reputable international companies in UK, Singapore and UAE. In 1994 she became Chartered Engineer in UK (MICE). She worked as an Adjunct Professor at UAE University before she joined Eastern Mediterranean University (EMU) in 2000. Besides she is the director of ROBUST Engineering and Consultancy Ltd, at EMU Techno Park. She has been the author of around 35 research articles/book chapters and supervised more than 40 postgraduate students. She is serving as reviewer to reputed ISI journals.

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